

## **REMARKS**

Applicant gratefully acknowledges the courtesy shown by Examiner Hendrickson in the telephone interview with the undersigned of Darby & Darby on April 5, 2004. A claim amendment was proposed by the Applicant wherein a carbonaceous nanotube of the invention further includes the limitation: "and the disordering is caused by hydrogen atoms." The interview included a discussion of previously considered prior art, which disclosed nanotubes having hydrogen at graphite lattice *edges* or *ends*, and the present rejections based on the Examiner's contention that "disordered layers" as claimed can be caused by stray carbon pentagons and heptagons. Applicant put forth the argument that the proposed amendment would place the claims in condition for allowance by tying together the previously considered issues of hydrogen-containing nanotubes and disordered layers. Such an amendment places hydrogen atoms within the arrangement of carbon hexagons, not merely at the "edges" or "caps". The Examiner indicated that he would consider entering the discussed claim amendments.

### **Status of the Claims**

Claims 13-23 are pending. Claims 13, 16, 20 and 22 have been amended. Support for the amended claims can be found at, for example, specification, page 8, lines 16-24.

### **Rejections Under 35 U.S.C. §§ 102(a), 102(b) and 103(a)**

Claims 13-23 stand rejected under 35 U.S.C. §102(b) as being anticipated by Jose-Yacaman et al., Appl. Phys. Lett. 1993 (hereinafter "Jose-Yacaman") with Ohta et al., U.S. Patent No. 5,489,477 (hereinafter "Ohta"), and Nolan et al., U.S. Patent No. 5,965,267 (hereinafter "Nolan") cited for inherent properties. Claims 13, 14, 16, 17 and 20-23 stand rejected under 35 U.S.C. §102(a) as anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Chang, U.S. Patent No. 5,916,642 (hereinafter "Chang"). Claims 20 - 23 stand

rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Endo et al., J. Phys. Chem. Solids 1993;54(12):1841-1848 (hereinafter “Endo”) in view of Nolan. Claims 20 - 23 stand rejected under 35 U.S.C. §102(b) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Ohta in view of Nolan. Applicant respectfully traverses the rejections for the reasons set forth below.

None of the references, or combination thereof, disclose or suggest a carbonaceous nanotube having a lattice disordered by hydrogen atoms. The references disclose carbonaceous nanotubes having a lattice (i.e., ordered) structure and hydrogen atoms at the edges/ends of the carbon lattice. Nolan discloses that hydrogen is present in the catalytically formed “nanotubes” of Jose-Yacaman (Nolan, col. 1, lines 63-67; col. 2, lines 1-6) wherein the nanotubes have “a certain reasonably low number of hydrogen capped plane edges” (Nolan, col. 2, lines 2-4). Further according to Nolan, Jose-Yacaman did not describe nanotubes at all but “nanotube-like filaments” (Nolan, col. 1, lines 63-67). Ohta discloses a method of bonding hydrogen to “the dangling bonds” on the cut sections of nanotubes (Ohta, col. 5, lines 61-65). Chang discloses nanotubes that “need to be made of layered material such as graphite” and have hydrogen atoms bonded to the carbons at the edges of the graphite sheets (Chang, col. 3, lines 53-54; col. 4, lines 30-34). The nanotubes disclosed in Endo have a lattice structure and are not disordered (Endo, page 1845). Thus, none of the references disclose or suggest a disordered graphite lattice wherein the disordering is caused by hydrogen atoms.

According to the Examiner, “disordered layers” as claimed encompasses imperfections “clearly visible in the references” (Office Action mailed March 15, 2004, page 3) and can be caused by stray pentagons and heptagons. The amended claims do not encompass stray pentagons and heptagons because the limitation that “the disordering is caused by hydrogen

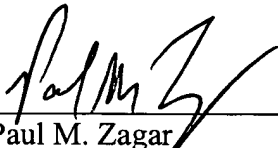
atoms" has been added. Any imperfections visible in the references cannot be a disordering of the carbon lattice caused by hydrogen atoms because hydrogen, if present, is at the edges/ends of the carbon lattice, and not interspersed within the lattice causing it to be disrupted.

### CONCLUSION

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Respectfully submitted,

  
\_\_\_\_\_  
Paul M. Zagar  
Reg. 52,392  
Attorney for Applicant

DARBY & DARBY, P.C.  
Post Office Box 5257  
New York, N.Y. 10150-5257  
Phone (212) 527-7700